INFORMATION REPORT INFORMATION REPORT

## CENTRAL INTELLIGENCE AGENCY

This material contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

OI the IOIIowing miniature tubes developed by the VEE Werk fuer Fermeldewesen  WF, Berlin-Oberschoeneweide:  a. Double triode 65L/61 (driver tube) for power triode 52/6 with a triode system and phase shift with the other triode system (but not push-pull stage). It was probably developed for the East Geman Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 63/5 : used as push-pull with transmitter tube 829, in which system the 63/5 is the modulator and the other the phase shifter. It was also probably developed for the East Geman Army. Prototype production was to begin in January 1959.  c. Miniature tube 384S and receiving equipment of the East Geman Army and exported to the Soviet East Geman Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA-35%, although 50X1-HL  ENCLOSURE ATTACHED  SECRET		SECRE	1		50X1-HUM
Summary of East German Processes  NO. PAGES  NO. PAGES  Summary of East German Processes  NO. PAGES  NO. PAGES  Technical descriptions  WF, Berlin-Oberschoeneweide:  a. Double triode 65L/NT (driver tube) for power triode 829/B with a trione option and phase smirt with the other triode system (but not push-pull stage). It was probably developed for the East German Army. Prototype production was to begin in January 1959.  b. Ministure modulator tube 6878  modulator or multi-purpose tube especially for marrine radio in combination other the phase shifter. It was also probably developed for the East German Army. Prototype production was to begin in January 1959.  c. Ministure tube 3848 and receiving equipment of the East German Army and exported to the Soviet Union also used as frequency multiplier. It was probably developed for the East German Ministry of National Defense. Prototype production was to begin in February 1959.  ENCLOSURE ATTACHED  S E C R E T	COUNTRY	East Germany	REPORT		
SUBMATE OF Transistor Manufacture  REFERENCES  ANATE OF NNO.  IACE & BATE ACC  SOUNCE EVALUATIONS ARE DESIRED.  OI the IOIIowing miniature tubes developed by the VEB Werk fuer Fermeldewesen  WF, Berlin-Oberschoeneweide:  a. Double triode 6SI/NT (driver tube) for power triode 329/B with a triode system and phase shift with the other triode system (but not push-pull stage). It was probably developed for the East German Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 6578  modulator or multi-purpose tube especially for marine radio in combination with transmitter tube 829, in which system the 6578 is the modulator and the Army. Prototype production was to begin in January 1959.  c. Miniature tube 3L/S and receiving equipment of the East German Ministure tube 3L/S and receiving equipment of the East Union; also used as frequency multiplier. It was probably developed for the East German Ministure tube 3L/S and receiving equipment of the East Union; also used as frequency multiplier. It was probably developed for the East German Ministure tube 3L/S and receiving equipment of the East Union; also used as frequency multiplier. It was probably developed for the East German Ministury of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA-3EX, although 50X1-HU  ENCLOSURE ATTACHED  SECRET	SUBJECT	Wr Werk, Berlin-Oberschoeneweide	DATE DISTR.	11 JUN 1959	
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SOUNCE EVALUATIONS ARE DECEMBENCE  SOUNCE EVALUATIONS ARE DECEMBENCE  To the IOIIOWing miniature tubes developed by the VEB Werk fuer Fermeldewsen  WF, Berlin-Oberschoeneweide:  a. Double triode 6SI/WI (driver tube)  for power triode 829/B with a trioue system and phase shift with the other triode system (but not push-pull stage). It was probably developed for the East Geman Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 6378  modulator or multi-purpose tube especially for marine radio in combination with transmitter tube 829, in which system the 6878 is the modulator and the Army. Prototype production was to begin in January 1959.  c. Miniature tube 3848  and receiving equipment of the East German Army and exported to the Soviet Union; also used as frequency multiplier. It was probably developed for the East German Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA-38%, although 50X1-HL  ENCLOSURE ATTACHED  SECRET			REFERENCES		
of the following miniature tubes developed by the VEB Werk fuer Fermeldewsen WF, Berlin-Oberschoeneweide:  a. Double triode 68170T (driver tube) for power triode \$29/B with a trioue system and phase shirt with the other triode system (but not push-pull stage). It was probably developed for the East German Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 6878 : used as push-pull with transmitter tube 829, in which system the 6378 is the modulator and the other the phase shifter. It was also probably developed for the East German Army. Prototype production was to begin in January 1959.  c. Miniature tube 3B/S and receiving equipment of the East German Army and exported to the Soviet Union; also used as frequency multiplier. It was probably developed for the East German Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA 3B/S represents a further development of the type.  ENCLOSURE ATTACHED  Secret	NFO. LACE &				` 50X1-HUM
or the following miniature tubes developed by the VBB Werk fuer Ferrmeldewesen WF, Berlin-Oberschoeneweide:  a. Double triode 6SL7GT (driver tube) for power triode 829/B with a trioter system and phase shift with the other triode system (but not push-pull stage). It was probably developed for the East German Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 6875 modulator or multi-purpose tube especially for marine radio in combination with transmitter tube 829, in which system the 6878 is the modulator and the other the phase shifter. It was also probably developed for the East German Army. Prototype production was to begin in January 1959.  c. Ministure tube 3B/S and receiving equipment of the East German Army and exported to the Soviet Union; also used as frequency multiplier. It was probably developed for the East German Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA*3BX, although *** 1984S represents a further development of the type.  ENCLOSURE ATTACHED  SECRET		SOURCE EVALUATIONS ADE DESIMITIVE A 2001	Allen or comme		
WF, Berlin-Oberschoeneweide:  a. Double triode 6SL7GT (driver tube) for power triode 829/B with a triode system and phase shift with the other triode system (but not push-pull stage). It was probably developed for the East German Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 6375 modulator or multi-purpose tube especially for marine radio in combination with transmitter tube 829, in which system the 6375 is the modulator and the other the phase shifter. It was also probably developed for the East German Army. Prototype production was to begin in January 1959.  c. Ministure tube 3B4S and receiving equipment of the East German Army and exported to the Soviet East German Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA-3B4, although 50X1-HL  ENCLOSURE ATTACHED  SECRET  ENCLOSURE ATTACHED  SECRET				technical descrip	50X1-HU
to power triode 829/B with a triode system and phase shift with the other triode system (but not push-pull stage). It was probably developed for the East German Army. Prototype production was to begin in January 1959.  b. Miniature modulator tube 6878		of the following miniature tubes develow F, Berlin-Oberschoeneweide:	ped by the VEB	Werk fuer Ferme	ldewesen
b. Miniature modulator tube 6878 modulator or multi-purpose tube especially for marine radio in combination with transmitter tube 829, in which system the 6878 is the modulator and the other the phase shifter. It was also probably developed for the East German Army. Prototype production was to begin in January 1959.  c. Miniature tube 3B48 and receiving equipment of the East German Army and exported to the Soviet Bast German Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA*3B4, although 50X1-HL  ENCLOSURE ATTACHED  SECRET  ENCLOSURE ATTACHED  SOX1-1		other triode system (but not much me	system and prull stage). It	TOO DITTE O MI OIL OIL	76
c. Ministure tube 3B4S and receiving equipment of the East German Army and exported to the Soviet Union; also used as frequency multiplier. It was probably developed for the East German Ministry of National Defense. Prototype production was to begin in February 1959. The equivalent Western type is the USA*3B4, although 50X1-HL SP4S represents a further development of the type.  ENCLOSURE ATTACHED  SECRET	٠	b. Miniature modulator tube 6575 modulator or multi-purpose tube espe with transmitter tube 829, in which other the phase shifter. It was also	cially for mar system the 657	: used as pu ine radio in comb S is the modulato	50X1-HU ush-pull pination
ENCLOSURE ATTACHED  SECRET  50X1-H	Ć	and receiving equipment of the East Union; also used as frequency multip	: use German Army and lier. It was p	d in portable tra d exported to the probably develope	Soviet d for the
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Transistors and Germanium Processes Used for Germanium Transistors and Germanium Plodes.

(Brief Summary of Processes Used in the Proparation of Base Materials - Semiconductor Crystals - in the manufacture of Germanium Transistors and Germanium Diedes)

## A. Cormaium-Junction-Translators.

- Operation 1: Parification of the Rew Material, ( This year material is Germanium imported in the form of Germanite or obtained from countries with an extensive sine precessing plants where it is a side product.)
  - Onemical Conversion into Germanium-Tetrachleride
  - Ten-te thirty times distillation, depending on the quality **b**) of the germanium tetrachleride
  - Hydrelysis to change the tetrachleride into the dioxide •)
  - Reduction of the germanium-dioxide by way of hydrogen to germanium powder
  - The germanium powder is smelted into red at 980°C.
- The germanium rods are cleaned by the "some melting process" Operation 2: Idmits of impurities:)
  (10-5 to 10-8)
- Operation 3: The erystals are drawn and the intermediate layer (basis) is introduced.
  - Smolting of the germanium erystals in graphite-crusibles in the presence of buffer gas
  - Introduction of the monocrystal seed into the melt D)
  - Introduction of antinony (n-conductor) for the "deping" of the specific resistance required in each case.
  - After the crystal has green enough, introduction of gallium (p-conductor) to over-compensate the n-conductor
  - e) After further growth of approximately 50 m re-deping for the a-conductor until the basic crystal has green to the required length.
- Operation 4: The basis erystals are out according to length and percent NECSEL The out surfaces are smoothed.
- Operation 5: The gold-wire is attached to the basic electrode
- Operation 6: The collector and cultter connections are attached and colden

50X1-HUM

Operation 7: Test field examination I.

Operation 8: Final Assembly including Surface finishing

Operation 9: Test field examination II

Operation 10: Aging process Acceptation

- a) Passage through the -40°C to + 60°C temperature cycle up to three times at a relative humidity of 90%, each cycle lasting 8 hours.
- b) Accompatie irradiation during 30 seconds with 50,000 cycles.
- e) Abrasive bombardment to enlarge the surface cross-section (high intensity, mechanical-static shaking, packing and unpacking of the material in order to obtain at the same time a roughening of the surfaces for a better adhesion of the
- 4) Passage through a -50°C to + 70°C temperature cycle 8 hours

Operation 11: Seet field examination III

Operation 12: Inequer application to the surface and marking of the type

Apparation of the properties of fereign body additives - 10-3 to 10-6%

## B. Cornelius Diodos

Operation 11: Same as for the Manaium junction transisters

Operation 12: Same as for the germanium junction transfistors

Operation 3: Mixing of the crystal melt with the optimum amount of the denorfereign material required in each case

Operation 4: Melting (processing ?) into balls of determined sises with "acute".

Operation 5: Outting the balls into halves with diamond saws.

Operation 6: Jeining Wolferingt of the hemispheres without a boundary effect on a hard-cilver plating carrier

Operation 7: Attaching the n-electrode

Operation 8: Activation Process with current densities up to 800,000 A/cm<sup>2</sup>.

Operation 9: Final assembly and surface finishing.

Operation 10: Testfield examination I with shaking process at approximately 5 to 8 g depending on the type of material and construction.

Operation 11: Aging process (tempering \*\*) (same as for the germanium junction Testfield examination II

operation 13: Inequering of surface and marking of type

the method for the manufacture of these transistors and 50X1-HUM Aging) which most known and therefore not used in the West

50X1-HUM